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J. Douglas
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S/N 09/217,873

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Mark Rapaich	Examiner: Paulos Natnael
Serial No.:	09/217,873	Group Art Unit: 2714
Filed:	December 21, 1998	Docket: 450.221US1
Title:	Digital YUV Video Equalization and Gamma Correction	

APPEAL BRIEF TO THE BOARD OF PATENT APPEALS AND INTERFERENCES OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box AF
Assistant Commissioner for Patents
Washington, D.C. 20231

3-27-01 pc

Sir:

Appellant's Brief on Appeal

This Appeal Brief is presented in support of the Notice of Appeal filed on December 16, 2000, from the final rejection of claims 1-11 of the above-identified application, as set forth in the Final Office Action mailed August 16, 2000.

The Appeal Brief is filed in triplicate. Please charge the requisite fee of $310.00 set forth in 37 C.F.R. § 1.17(c) to Deposit Account 50-0439. Please charge any required additional fees or credit overpayment to Deposit Account 50-0439.

Real Party in Interest

The real party in interest, in addition to the above-named Applicant, is Gateway 2000, Inc.. The present application has been assigned to Gateway 2000, Inc., a corporation organized and existing under and by virtue of the laws of the State of Delaware, and having an office and place of business at 610 Gateway Drive, P.O. Box 2000, North Sioux City, SD 57049-2000, in an assignment recorded on December 21, 1998 (Reel /Frame 9673/0727).

Related Appeals and Interferences

There are no other appeals or interferences known to Appellant which will have a bearing on the Board's decision in the present appeal.

Status of the Claims

Claims 1-11 are pending in the application and have all been finally rejected. The rejected claims 1-11 are the subject of the present appeal.

Status of the Amendments

Subsequent to the Final Office Action, a clerical amendment to claim 2 was proposed, correcting a misspelling. The pending claims, showing the proposed amendment, are listed in Appendix 1. No indication was given in the Advisory Action as to whether this proposed amendment to claim 2 has been entered.

Summary of the Invention

The invention defined in the claims on appeal includes a personal computer system comprising a video source capable of providing a digital YUV video signal, a video output capable of connecting to a video display device, and a digital processor employing a corrective algorithm that applies gamma correction to the digital YUV signal provided by the video source and provides a corrected signal to the video output. The invention defined in the claims on appeal also includes a process comprising receiving a YUV digital video signal, applying gamma correction to the digital YUV signal within a personal computer, and providing a corrected digital YUV signal to an output for connection to a display device.

In one embodiment, a processor applies an algorithm to the digital YUV signal and is incorporated into video hardware in a personal computer (Specification, page 6, lines 16-21). The video hardware receives a digital YUV signal from a source such as a DVD player (Specification, page 6, lines 17-18; page 7, lines 2-3). The algorithm is empirically determined in one embodiment for the type of display device used to display the signal (Specification, page 6, lines 21-22). The algorithm comprises a least-squares fit polynomial equation or a lookup table (Specification, page 6, lines 21-24). The video hardware then corrects the displayed intensity by applying one or more corrections such as gamma correction, color saturation, tint, brightness, or contrast correction (Specification, page 6, lines 25-28).

In a further embodiment, gamma, color saturation, tint, brightness, and contrast correction may be digitally controlled by software that allows a user to set the correction factors such as the gamma correction factor (Specification, page 7, lines 4-8). The video hardware then applies this user-specified correction factor to the video signal through digital processing (Specification, page 7, lines 4-8).

In another embodiment, the video hardware may receive video encoded with a gamma correction factor (Specification, page 6, lines 25-28). The gamma correction factor is then compensated for by applying gamma correction needed for other video components such as a CRT, and result in a displayed image that is displayed with the proper gamma for both the video source and display (Specification, page 6, line 28 to page 7, line 1).

Issues Presented for Review

1. Whether claims 1-10 are patentable over Hannah (U.S. Patent No. 5,568,192).
2. Whether claim 11 is patentable over Eglit (U.S. Patent No. 5,734,362) in view of Hannah (U.S. Patent No. 5,568,192) and in further view of Music (U.S. Patent No. 5,739,861).

Grouping of the Claims

The claimed embodiments of the present invention are defined within the following grouping of claims: (i) claims 1-10; and (ii) claim 11. The claims of each group stand or fall together. Each group of claims is separately patentable from the other group of claims, and thus warrant independent consideration.

Argument

1) Rejection Under 35 U.S.C. § 102

a) The Applicable Law

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *MPEP § 2131.* The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *MPEP §2131* (citing *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990)).

Anticipation focuses on whether a claim reads on a product or process disclosed in a prior art reference, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983). To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter. *PPG Industries, Inc. v. Guardian Industries Corp.*, 75 F.3d 1558, 37 USPQ2d 1618 (Fed. Cir. 1996).

The Examiner is required to provide the best references and clearly describe how they include each of the elements in the claimed invention.

> In rejecting claims for want of novelty or for obviousness, the examiner must cite the best references at his or her command. When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified. *37 C.F.R. §1.104(c)(2).*

b) Discussion of the Rejection

The Examiner rejected claims 1-10 under 35 U.S.C. § 102(b) as being anticipated by Hannah (U.S. Patent No. 5,568,192).

Regarding claim 1, the Examiner asserts that:

(1) the claimed video source capable of providing a digital YUV signal is met by item 401, figs. 4 and 5;

(2) the claimed video output capable of connecting to a video display is met by item 421, fig. 6; and

(3) the claimed digital processor employing a corrective algorithm that applies

gamma correction to the digital YUV signal provided by the video source and provides a corrected signal to the video output is met by item 430, fig. 6 (see also col. 4, lines 34-36; col. 6, lines 27-67; col. 9, lines 5-67).

Hannah discusses a system and method for processing digital video signals in the RGB color space. Hannah discloses gamma correction of digital video signals, but teaches that this correction must be performed in the RGB color space (*see, e.g.*, col. 6, ln. 29-56). After gamma correction, the RGB color space signal is then converted to the YUV color space as needed (*see, e.g.*, col. 5, ln. 54-60; col. 6, ln. 54-56).

In contrast, the present invention as claimed in claim 1 performs gamma correction to digital video signals in the YUV color space and incorporates a digital processor which employs an algorithm that applies such correction to a digital YUV video signal. Hannah does not teach "a digital processor employing a corrective algorithm that applies gamma correction to the digital YUV signal," as recited in claim 1, because Hannah applies gamma correction only on signals in the RGB color space.

In response to these arguments, page 5 of the Final Office Action contends that conversion in YUV rather than RGB is "merely a design choice" and does not distinguish the invention from the prior art. Applicant respectfully traverses this rejection. Attention is drawn, for example, to the Background of the pending application (*see* page 2, lines 11-22) in which the need for and distinguishing features of YUV gamma correction (which is the same as YcrCb color space noted by the Examiner -- *see, e.g.,* http://www.conexant.com/pressroom/whitepapers/pci_advantages/default.asp#37) are introduced (emphasis added):

> Digital video in the YUV color space involves encoding of luminance (Y) and chrominance (UV) information in digital form.... Application of gamma correction to such a signal involves either conversion to the RGB color space before gamma correction or application of more complex mathematical algorithms than are needed in the RGB color space. Gamma correction of YUV signals is therefore computationally much more demanding if corrected in the YUV color space, so digital gamma correction of digital YUV signals is typically done after conversion to the RGB color space. There is a need to apply gamma correction to digital YUV signals in personal or general purpose computers without converting the signal to digital RGB as a necessary step in performing the gamma correction.

Unlike Hannah, which requires gamma correction in the RGB color space and then conversion to the YUV color space, the present invention as claimed in claim 1 performs gamma correction of the digital signal in the YUV color space, thus eliminating the need to convert the signal to or from the RGB color space. The present invention performs gamma correction in a structurally and functionally different way than Hannah, and therefore, is patentably distinct from Hannah. Accordingly, Applicant respectfully requests that the rejection of claim 1 and claims 2-5 depending therefrom be withdrawn.

Regarding claims 6-10, the Examiner asserts that claims 6-10 are method or process claim versions of claims 1-5, and thus, are anticipated by Hannah for the same reasons as claims 1-5.

Applicant points out that, similar to claims 1-5, the present invention as claimed in claim 6 also performs gamma correction to digital video signals in the YUV color space. Hannah does not teach "applying gamma correction to the digital YUV signal within a personal computer," as recited in claim 6, because Hannah applies gamma correction only on signals in the RGB color space. Claim 6 is therefore distinct from the cited Hannah reference for the same reasons discussed above with respect to claim 1. Accordingly, Applicant respectfully requests that the rejection of claim 6 and claims 7-10 depending therefrom be withdrawn.

2) Rejection Under 35 U.S.C. § 103

a) The Applicable Law

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). To meet that burden, the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.*

The court in *Fine* stated that:

> Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 878 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined

only if there is some suggestion or incentive to do so." *Id.* (emphasis in original).

The M.P.E.P. adopts this line of reasoning, stating that:

> In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

An invention can be obvious even though the suggestion to combine prior art teachings is not found in a specific reference. *In re Oetiker*, 24 USPQ2d 1443 (Fed. Cir. 1992). At the same time, however, there must be some teaching which provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem which the claimed invention addresses. One of ordinary skill in the art will be presumed to know of any such teaching. *See, e.g., In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); *In re Wood*, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979).

The test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985). Furthermore, claims must be interpreted in light of the specification, claim language, other claims and prosecution history. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987), *cert. denied*, 481 U.S. 1052 (1987). At the same time, a prior patent cited as a § 103 reference must be considered in its entirety, "*i.e.* as a *whole*, including portions that lead away from the invention." *Id.* That is, the Examiner must, as one of the inquiries pertinent to any obviousness inquiry under 35 U.S.C. § 103, recognize and consider not only the similarities but also the critical differences between the claimed invention and the prior art. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir. 1990). Finally, the Examiner must avoid hindsight. *Id.*

b) Discussion of the Rejection

Independent claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Eglit (U.S. Patent No. 5,734,362) in view of Hannah (U.S. Patent No. 5,568,192) and in further view of Music (U.S. Patent No. 5,739,861).

Eglit discloses a brightness control for liquid crystal displays, including brightness control provided within a motion video architecture data path 30 (*see* Fig. 2) that is operable to correct the brightness of a digital YUV signal and convert the signal to RGB for display. Eglit teaches that correction of the YUV signal consists of adding an 8-bit brightness value to the Y (luminance) portion of the YUV digital signal in order to correct for brightness response of an LCD display. However, as noted by the Examiner, Eglit does not teach gamma correction to a digital YUV signal.

The Hannah reference does not make up for the deficiencies of the Eglit reference. Similar to claims 1-10 discussed above, the present invention as claimed in claim 11 applies gamma correction to digital video signals in the YUV color space. Hannah does not teach "a digital processor that applies gamma correction to the digital YUV signal provided by the video source," as recited in claim 11, because Hannah applies gamma correction only on signals in the RGB color space. Claim 11 is therefore patentable over Hannah for the same reasons discussed above with respect to claims 1-10.

Further, the Music reference does not make up for the deficiencies of the Eglit and Hannah references. The Final Office Action states on page 4, lines 12-14 that Music discloses a system that first converts RGB values into digital RGB values and then gamma corrects, citing col. 6, lines 4-7 of Music. Applicant respectfully points out, however, that col. 6, lines 4-7 of Music discloses gamma correction only in the camera itself: "TV cameras employ a non-linear correction called 'Gamma Correction.'" Therefore, Music fails to teach or suggest correction of a digital signal or correction in the YUV color space, as recited in claim 11.

Moreover, nothing in the cited references or the Office Actions shows that there is any teaching, suggestion, or motivation to combine the references, and so, such combination is improper. *See MPEP* § 2143.01, 2145.

Because the cited references are not properly combinable, and any combination of the cited references still fails to anticipate the recited element "a digital processor that applies

gamma correction to the digital YUV signal," claim 11 is patentable over the cited references. Accordingly, withdrawal of the rejection of claim 11 is respectfully requested.

CONCLUSION

Applicant believes the claims are in condition for allowance and requests withdrawal of the rejections to claims 1-11. Reversal of the Examiner's rejections of claims 1-11 in this appeal is respectfully requested.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Box AF, Assistant Commissioner of Patents, Washington, D.C. 20231 on **February 28, 2001**.

Candis B. Buending
Name

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Signature

Appendix 1: Pending Claims

1. A personal computer system comprising:

a video source capable of providing a digital YUV video signal;

a video output capable of connecting to a video display device;

a digital processor employing a corrective algorithm that applies gamma correction to the digital YUV signal provided by the video source and provides a corrected signal to the video output.

2. (Amended) The personal computer of claim 1 wherein the digital processor further employs a corrective [algoritm] algorithm that corrects at least one of color saturation correction, tint correction, brightness correction and contrast correction.

3. The personal computer system of claim 1, further comprising a software module for user configuration of the digital processor that corrects the digital YUV signal.

4. The personal computer system of claim 1, wherein the video sources comprise multiple sources selected from the group consisting of MPEG, NTSC, CVD, CD and satellite broadcast digital video signals.

5. The personal computer system of claim 2, wherein the digital YUV video signal is encoded with a correction factor that is compensated for in applying the corrective algorithms to the digital YUV signal.

6. A process comprising the steps of:

receiving a YUV digital video signal;

applying gamma correction to the digital YUV signal within a personal computer; and

providing a corrected digital YUV signal to an output for connection to a display device.

7. The process of claim 6 further comprising applying correction to the digital YUV signal such that the correction comprises at least one of color saturation correction, tint correction, brightness correction and contrast correction.

8. The process of claim 6, further comprising a step of configuration of a software module that configures the digital signal processor that corrects the digital YUV signal.

9. The process of claim 6, wherein the received YUV digital video signal is provided by video sources selected from the group consisting of MPEG, NTSC, CVD, CD and satellite broadcast digital video signals.

10. The process of claim 6, wherein the received digital YUV video signal is encoded with a correction factor that is compensated for in applying gamma correction to the digital YUV signal.

11. A personal computer system comprising:

a processor;

a bus;

main memory;

a system controller;

a graphics controller;

a video source capable of providing a digital YUV video signal;

a video output capable of connecting to a video display device; and

a digital processor that applies gamma correction to the digital YUV signal provided by the video source and provides a corrected signal to the video output.